

1 1) Instructions

2 To run this program, navigate to the directory containing the extracted files, and run make (or make wordstat) to compile the executable.

3 Launch the executable by running "./wordstat" with the proper options. Launching without any arguments displays the arguments menu.

4 To remove any temporary .o files or executables, run make clean.

5 2) Summary of design

6 The application parses the command line arguments, which are used to select program functionality.

7 Based on the command line option provided, the main function launches a function tailored to a specific purpose.

8 The line-count function just uses fgets to retrieve a line from the file at a time, and returns the number of lines it found.

9 The word-count function works similarly, but inserts words split from the line from fgets and inserts them into a linked list, then uses a function to add the values together.

10 The palindrome and palindrome count functions work similarly to the word-count, but only insert "words" that are palindromes. The frequency is tracked by the linked list, and the option just specifies whether it should print the number or not.

11 3) Running time analysis

12 The runtime of this program should be  $O(n^2)$ , because I'm inserting elements into a linked list. The "best case" would be a list sorted reverse-alphabetically, because inserting requires only looking at the first node and inserting the new node before it. Worst case is a list already sorted alphabetically, because insertion requires traversing the full list before an insertion can be made.

13 4) Space requirement analysis

14 I used dynamic allocation for the linked list, nodes, and strings within the nodes, which are freed when no longer needed. I implemented this by the function destroylist, and called it whenever the list was no longer needed.

15 5) Challenges encountered

16 I put off starting the assignment for too long, and then put off finishing it longer than I should have.

17 I completed some simple programs in C, and thought that I would have enough time to complete the assignment in the time I gave myself, but debugging C was a lot more time-intensive than I anticipated.

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